EXECUTIVE SUMMARY

This report is the 10th in a series of Congressionally mandated biennial reports on the status of women and minorities in science and engineering. Its primary purpose is as an information source on the participation of women, minorities, and persons with disabilities in science and engineering.[1]

Changes since the first NSF report on women and minorities in 1982

Some of the findings in the first report of this series (NSF 1982)—the relatively small percentages of women and minorities earning science and engineering degrees and in science and engineering employment, the concentration of women and minorities in specific fields, the higher rates of part-time employment of women, the lower salaries of women and minorities, and the lower percentages of women in full professorships—still apply today. There has been progress, however, in several areas.

As did the 1982 report, the current report found that at all levels of education and in employment, women are less likely than men to choose science and engineering fields. Also, within science and engineering, women are more prevalent in some fields—psychology, social sciences, and biological sciences—than others. Data in the 1982 and this 2000 report both indicate that men and women differ little in labor force participation, but that women were more likely than men to be employed part time and to be unemployed; that women doctoral scientists and engineers employed in educational institutions were less likely than men to be tenured or have the rank of full professor—even after adjusting for age or years since doctorate; and that women scientists and engineers received lower salaries than men.

The current report also finds numerous similarities to the 1982 report's findings on participation of minorities in science and engineering. As in 1982, little difference exists among racial/ethnic groups in the proportion reporting management as their primary or secondary work activity, with the exception of Asians. A lower percentage of Asian scientists and engineers than of those from other racial/ethnic groups reported management as a primary or secondary work activity. Also, as in the 1982 report, black and Hispanic faculty were less likely than white faculty to be full professors, even after adjusting for differences in age; and blacks and Hispanics earned lower salaries than white and Asian scientists and engineers within fields and within broad age categories.

The current report found a number of areas in which progress has been made for women since the 1982 report was published. In education, both the numbers and percentages of women completing high school; enrolling in college; and completing bachelor's, master's, and doctoral degrees in science and engineering have increased over time. Women are more likely than men to graduate from high school and to enroll in college, and are as likely as men to graduate from college. In 1996, women received close to half (47 percent) of all science and engineering bachelor's degrees awarded, 39 percent of the master's degrees, and 33 percent of the doctorates. Women have accounted for an increasing percentage of the bachelor's degree recipients in all major science and engineering fields except mathematics and computer science. In science and engineering employment, women—especially younger women—are as likely as men to report management as their primary or secondary work activity. Among older age groups, however, women are less likely than men to report management as their primary or secondary work activity.

[1] Generally, the definition of scientists or engineers used in this report includes those who hold at least a bachelor's degree in or are employed in the physical sciences; earth, atmospheric, and ocean sciences; agricultural sciences; biological sciences; mathematical sciences; computer sciences; social sciences; psychology; or engineering.

Progress is also evident in the educational attainment of minorities. Both numbers and percentages of blacks, Hispanics, and American Indians completing high school; enrolling in college; and completing bachelor's, master's, and doctoral degrees in science and engineering have increased over time. On the other hand, blacks, Hispanics, and American Indians remain less likely than whites and Asians to graduate from high school, enroll in college, and graduate from college. Field choice among bachelor's and master's degree recipients is now similar among racial/ethnic groups except for Asians. Blacks, Hispanics, and American Indians earn roughly the same percentage of all science and engineering degrees as they do of non-science and -engineering bachelor's degrees.

The first *Women and Minorities in Science and Engineering* report in 1982 did not present data on persons with disabilities. Each report in the series since then has included some data on this population. The current report found little difference between persons with and without disabilities in undergraduate major and science and engineering occupation and relatively few differences between scientists and engineers with and without disabilities in terms of salaries, percentages in management, percentages who are full professors, and field distribution. Differences do exist, however, in educational attainment and in science and engineering labor force participation rates. Students with disabilities were less likely than those without to graduate from high school, to enroll in college, and to graduate from college. Among scientists and engineers, one-third of those with disabilities were out of the labor force in 1997, compared with 11 percent of those without disabilities. Scientists and engineers with disabilities also had higher unemployment rates than those without.

Specific concerns

In addition to examining changes in participation since the 1982 report, the current report examines some specific concerns raised in the last few years:

- the declining numbers and percentages of women in computer science,
- the declining numbers and percentages of minorities in engineering,
- the effects of challenges to affirmative action on the undergraduate and graduate enrollment of minorities in science and engineering,
- the higher attrition rates of minorities in undergraduate education, and
- the paucity of data on persons with disabilities in science and engineering education.

The declining numbers and percentages of women in computer science

In computer science, the numbers and percentages of bachelor's degrees to women have decreased in the last decade. Women earned 37 percent of the bachelor's degrees in computer science in 1984 and 28 percent in 1996. The number of bachelor's degrees in computer science declined from 1984 to 1996 for both men and women, but the number of degrees awarded to women dropped faster than the number of degrees to men. Women earned a slightly lower percentage of the master's degrees in computer science in 1996 than they did in 1984 (27 and 29 percent, respectively) but a higher percentage of the doctoral degrees in computer science in 1996 than in 1984 (15 and 12 percent, respectively).

The declining numbers and percentages of minorities in engineering

Minority[2] full-time first-year undergraduate enrollment in engineering decreased 5 percent from 1992 to 1996. Black students accounted for most of the drop: Black full-time first-time undergraduate enrollment dropped 16 percent from 1992 to 1996, and blacks were the only racial/ethnic group in which undergraduate engineering enrollment went down between 1996 and 1997. However, recently released data from the Engineering Workforce Commission show that black full-time first-time engineering enrollment increased between 1997 and 1998.

The effects of challenges to affirmative action on the graduate enrollment of minorities in science and engineering

Changes in legislation or admissions policies took place in California and Texas in 1997 that barred the use of race in graduate admissions decisions. Data from the National Science Foundation's Survey of Graduate Students and Postdoctorates in Science and Engineering show no changes in patterns of total graduate science and engineering enrollment of blacks and Hispanics in these states between 1996 and 1997.

[2] Minorities include Asian, black, Hispanic, and American Indian students.

Higher attrition rates of minorities in undergraduate education

Black and Hispanic students are less likely than white and Asian students to complete a bachelor's degree in any field within 5 years. Forty-eight percent of whites, 47 percent of Asians, 34 percent of blacks, and 32 percent of Hispanics who entered a bachelor's degree program in 1989 had earned their degree by spring 1994. Thirty-seven percent of both black and Hispanic students, compared with 27 percent of white students and 26 percent of Asian students, had earned no degree and were no longer enrolled toward a bachelor's after 5 years.

The paucity of data on persons with disabilities in science and engineering education

Two National Center for Education Statistics surveys, the National Postsecondary Student Aid Survey and the 1990 Beginning Postsecondary Students Longitudinal Study, provide some information on students with disabilities who are enrolled in undergraduate and graduate science and engineering programs, including demographic characteristics, receipt of financial aid, type of school attended, and undergraduate persistence and attainment patterns. These surveys are sample surveys of individuals.

No data on the numbers of science and engineering bachelor's and master's degrees awarded to persons with disabilities are available. Data on disabilities do not tend to be included in comprehensive academic institutional records; and, if they are, such information is likely to be kept confidential as a means of providing special services to students. To the extent that such information is collected and kept, institutions maintain these data only on those students who identify themselves to the institution as having a disability. The majority of academic institutions do not maintain records of students with disabilities in their general student record system.

References

National Science Foundation (NSF). 1982. *Women and Minorities in Science and Engineering: 1982.* NSF 82-302. Washington, DC.